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## CASE REPORT

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# Diagnosing Jejunal Volvulus in a Patient with a History of Left Lateral Hepatic Segmentectomy and Roux-en Y Hepaticojejunostomy

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### ABSTRACT

*This report describes a patient with jejunal volvulus leading to both afferent and efferent loop obstruction. The patient had a history of Roux-en Y reconstruction after left lateral hepatic segmentectomy for recurrent pyogenic cholangitis. The clinical picture and computed tomography findings of the afferent- and the efferent-loop obstruction are described.*

*Key Words: Afferent loop syndrome; Cholangitis; Intestinal obstruction; Intestinal volvulus*

### INTRODUCTION

Jejunal volvulus is a rare but well-known complication associated with Roux-en-Y reconstruction, but it usually only involves the Roux limb. Afferent loop volvulus is rare and, to the authors' knowledge, has only been reported twice previously.

### CASE REPORT

A 76-year-old woman presented to the Accident and Emergency Department at the Pamela Youde Nethersole Eastern Hospital, Hong Kong, in 2009 with epigastric pain and vomiting for 4 days. She had a history of recurrent pyogenic cholangitis (RPC), for which hepatic lateral segmentectomy and antecolic Roux-en Y hepaticojejunostomy with a cutaneous loop was done in 2002. She had no fever, and her blood pressure was 136/81 mm Hg and pulse was 86 bpm. At physical examination she had epigastric tenderness without rebound.

Laboratory tests showed that the patient had deteriorating renal function. Her creatinine increased from 161  $\mu\text{mol/L}$  to 323  $\mu\text{mol/L}$  (normal range, 53-106  $\mu\text{mol/L}$ ) in 4 days

and her total bilirubin increased from 8.2  $\mu\text{mol/L}$  to 22.4  $\mu\text{mol/L}$  (normal range, 5-21  $\mu\text{mol/L}$ ) in 5 days.

The patient was admitted to the ward, but her condition did not improve with the 'drip and suck' approach. Therefore, computed tomography (CT) scan of the abdomen was done.

### Computed Tomography Findings

Due to the patient's deteriorating renal function, only plain transaxial CT scan (Aquilion 16; Toshiba, Otawara, Japan) was done. Oral contrast (Gastrograffin [diatrizoate meglumine and diatrizoate sodium solution] 12 mL plus water 600 mL) was given to the patient 1 hour before the procedure. Evidence of left lateral segmentectomy and antecolic hepaticojejunostomy was noted (Figure 1).

The Roux limb was grossly dilated, and contained oral contrast (Figure 2). Whirling of the mesentery and small bowel clockwise for 360° was noted at the periumbilical region (Figure 3). The small bowel distal to the jejunojunction was collapsed. The oral contrast only reached the proximal jejunum and tapered at the centre of the whirling, suggesting obstruction. The afferent loop was also grossly dilated; the point of transition was at the centre of the whirling (Figure 2). The intrahepatic ducts were also dilated (Figure 4). The CT findings were diagnostic of concurrent afferent and efferent loop obstruction, possibly due to the small bowel volvulus at

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**Figure 1.** Computed tomography scan with oral contrast showing (a) a grossly dilated afferent limb (arrow); (b) contrast visible inside the dilated Roux limb (arrow); (c) evidence of previous left lateral segmentectomy and antecolic Roux-en-Y reconstruction (arrow); and (d) the afferent loop is grossly dilated and located immediately anterior to the transverse colon (thin arrow). No internal herniation of the small bowel is present at the space between the afferent limb and the transverse colon.

the site of the jejunojejunostomy. The patient underwent decompression of small bowel obstruction.

### Intraoperative Findings

Intraoperatively, the proximal jejunum and Roux-limb to the jejunojejunostomy anastomotic region were grossly distended. Small bowel obstruction due to jejunal volvulus with a twisting point at the jejunojejunostomy anastomosis was noted. The twisting segment of the proximal jejunum also showed ischaemic changes with a 1-cm bowel perforation, although no pneumoperitoneum was noted on the CT scan. Decompression of the obstructed small intestine, partial resection of the

perforated small bowel, and reconstruction of jejunojejunostomy were performed.

### Postoperative Clinical Findings

After the operation, the patient's renal function improved; the creatinine level was 110  $\mu\text{mol/L}$  on day 3 and the bilirubin level normalised to 9.4  $\mu\text{mol/L}$  on day 1. The patient's condition stabilised and she was transferred from the intensive care unit to a surgical ward on day 2.

### DISCUSSION

RPC, also known as oriental cholangiohepatitis, is a complex disease that is characterised by



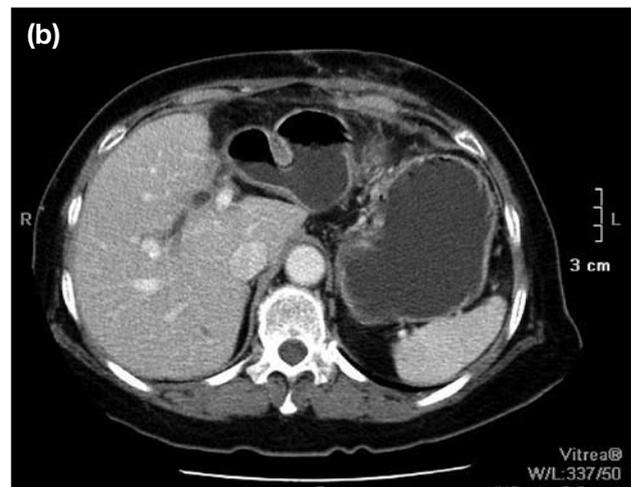
**Figure 2.** Maximal intensity projection image of the coronal reconstruction of the abdomen. Positive contrast is visible inside the stomach and Roux limb. The afferent loop (arrows) are also grossly dilated. The small bowel mesentery is congested.



**Figure 3.** Computed tomography scan showing whirling of the mesentery and small bowel clockwise for 360° at the periumbilical region (arrow). The centre of the whirl is also the transition point for obstruction of the afferent and Roux limbs.

intrahepatic pigmented stones and recurrent attacks of cholangitis.<sup>1</sup>

The stones in RPC are commonly located in the left lateral segments, making complete clearance by endoscopic retrograde cholangiopancreatography or surgical exploration of the common bile duct difficult. More specific treatment would be surgical resection of the stone-harboring segments,<sup>2,3</sup> while hepaticojejunostomy is a common option for biliary bypass. In this patient, the blind end of the hepaticojejunostomy was fixed to the



**Figure 4.** Computed tomography scan in (a) 2009 showing dilated intrahepatic ducts; and (b) 2002.

anterior abdominal wall as the cutaneous loop in the same surgery of left lateral hepatic segmentectomy. In case of recurrence of the biliary obstruction by ductal stones, there would be no difficulty in constructing a cutaneous stoma and performing choledochoscopy via the jejunal loop.<sup>4</sup> Roux-en-Y anastomoses are also performed for gastric cancer, gastric bypass surgery for morbid obesity, and orthotopic liver transplantation.

Jejunal volvulus is a rare but well-known complication associated with Roux-en-Y reconstruction in gastric bypass<sup>5,6</sup> and liver transplant,<sup>7</sup> but it is often associated with internal hernia, and usually only involves the Roux limb. Afferent loop volvulus is rare and, to the authors' knowledge, has only been reported twice previously.<sup>8,9</sup>

CT findings of a jejunal volvulus include distended fluid-filled proximal bowel hoops, abrupt point of transition with the collapsed distal intestinal hoops, and U-shaped distended twisted hoops containing oral

contrast material. The presence of the whirl sign, which is due to the twisting of the mesentery, is characteristic.<sup>10</sup> This is clearly the most specific sign of volvulus, seen in 75% of patients, but it may not be apparent when the mesenteric axis is not parallel to the tomographic section.<sup>10,11</sup> The presence of mesenteric oedema helps to differentiate the pseudo-whirling appearance seen in the proximal jejunum from true mesenteric twisting.

Afferent limb involvement in this patient was suggested by the elevating total bilirubin level, which normalised after decompression. CT scan also confirmed dilatation of the afferent limb and intrahepatic ducts. There are few case reports in the literature describing ascending cholangitis due to afferent limb obstruction.<sup>12</sup>

To the authors' knowledge this is the first report of jejunal volvulus leading to concurrent afferent and efferent loop obstruction in a patient with a history of Roux-en Y reconstruction after left lateral hepatic segmentectomy for RPC.

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